

Air Force Civil Engineer Center

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WILLIAMS AIR FORCE BASE*

**Site LF004 Landfill
Remedial Action**

**BCT Conference Call
16 April 2020**



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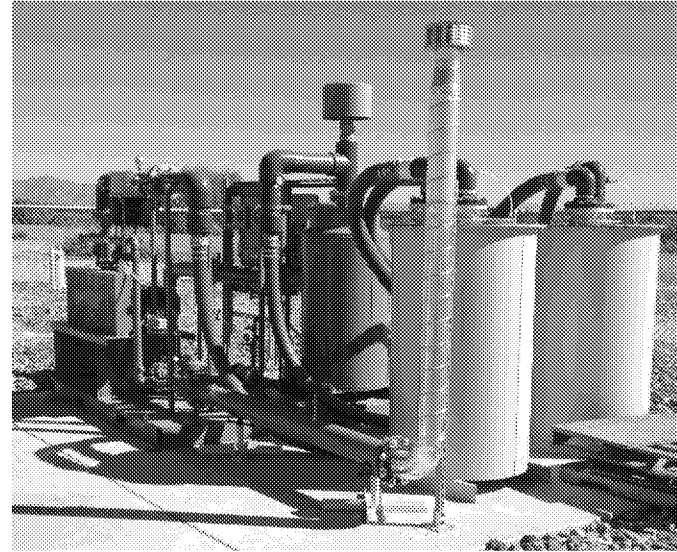
LF004 Recent and Upcoming Activities

- **Draft 2019 landfill inspection report under AF review**
- **SVE and well decommissioning documents submitted to EPA and ADEQ on 3 April 2020. ADEQ requested a time extension for reviewing document on 10 April 2020.**
- **PDB sampling scheduled for Apr-May 2020**



LF01-W17 Area IWAS System Update

- Final November 2019 PDB results indicate all monitoring wells below the TCE MCL with the exception of LF01-W17S (7.9 $\mu\text{g/l}$) and LF01-W30M (10 $\mu\text{g/l}$)
- Previous May 2019 PDB for LF01-W17S (9 $\mu\text{g/l}$) and LF01-W30M (12 $\mu\text{g/l}$)
- Monitoring wells upgradient and downgradient of LF01-W17S and LF01-W30M are below TCE MCL
- PDB sampling event scheduled in Apr-May 2020





Southern Area SVE and Oxidant Injection

- **Final November 2019 PDB results indicate only three PCE MCL exceedances: W19S at 7.8 µg/l (dup 8.2 µg/l), W19D 5.6 µg/l (dup 5.4 µg/l), and W24M at 6.2 µg/l (dup 5.4 µg/l). Previous May 2019 PDB results for W19S 8.1 µg/l (dup 9.1 µg/l), W19D <1.0 µg/l and W24M 9.7 µg/l (dup 8.6 µg/l).**
- **Upgradient wells in the vicinity of W19 and downgradient wells in the vicinity of W24 are below the PCE MCL**
- **PDB sampling event scheduled in Apr-May 2020**

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**Site FT002
Fire Training Area Remedial
Action**

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16 April 2020**

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Site FT002 Update

- **AF approved keeping the DEUR in place Nov 2018**
- **Draft Explanation of Significant Differences (ESD) document to add the land use control to the ROD is under AF review**
- **Revised Final Remedial Action Completion Report submitted 22 Nov 2019**
- **Received EPA comment letter on 31 Dec 2019. Received ADEQ comments on 12 Feb 2020. Response to comments under internal AF review.**
- **Draft ESD submitted for AF legal review April 2020**

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Site SS017
Old Pesticide/Paint Shop**

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Site SS017 Groundwater Monitoring Update

- Q3 (Aug) 2018 data summary report submitted 12 Apr 2019. ADEQ comments received on 10 Feb 2020. Response to comments and final report in preparation.
- Annual (Nov) 2018 groundwater report submitted 18 Apr 2019. Reissued hard copy reports on 30 Apr 2019. ADEQ comments received on 10 Feb 2020. Response to comments and final report in preparation.
- Draft Q2 (Jun) 2019 data summary report submitted 30 Dec 2019. ADEQ comments received on 10 Feb 2020. Response to comments and final report in preparation.
- Draft Q3 (Aug) 2019 data summary report submitted 31 Dec 2019. ADEQ comments received on 10 Feb 2020. Response to comments and final report in preparation.
- Draft Q4 (Nov) 2019 annual report in preparation



Groundwater Monitoring Preliminary Data

- **Dieldrin exceeded the EPA RSL of 0.0018 $\mu\text{g/L}$ in MW02 at 0.110 $\mu\text{g/L}$ (dup 0.091 $\mu\text{g/L}$)**
- **Endrin was detected at a concentration of 0.001 J $\mu\text{g/L}$ (dup 0.00057 JP $\mu\text{g/L}$)**
- **4 4-DDE was detected at 0.00054 JP $\mu\text{g/L}$ (dup 0.00057 JP $\mu\text{g/L}$)**
- **Duplicate sample also had 44-DDD at 0.00078 JP $\mu\text{g/L}$ and Endosulfan II at 0.0012 JP $\mu\text{g/L}$**



Parcel K-1-2 Property Transfer

- **FOST (final version in track changes responding to EPA comments) was issued via email for regulatory concurrence 24 Jul 2019 with follow up email 9 Aug 2019**
- **FOST clean copy with all revisions, responses to comment and ADEQ requested changes issued 15 Oct 2019**
- **ADEQ concurrence previously received. EPA concurrence letter received 19 Dec 2019**
- **Final FOST is being routed for AF signature in April 2020**
- **Draft DEUR and assignment package to be prepared**

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Site ST012

**Former Liquid Fuel
Storage Area**

**BCT Call
16 April 2020**



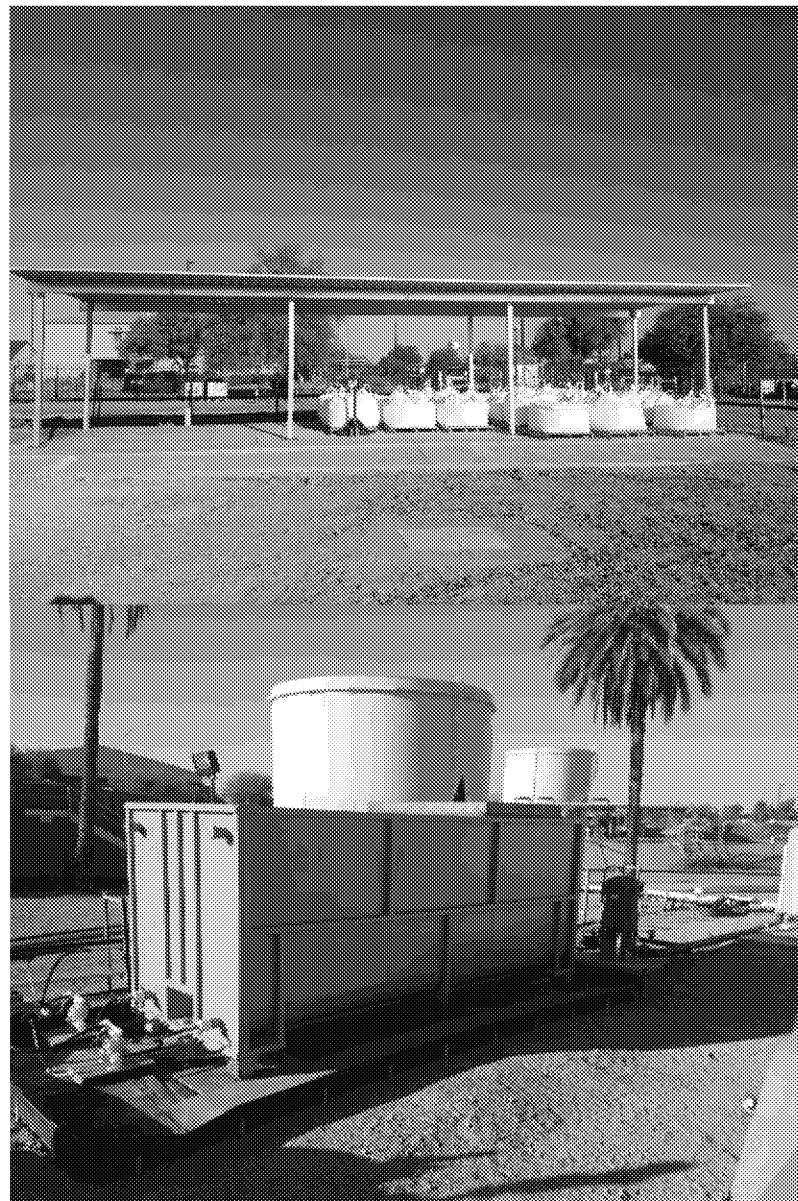
Site ST012 Outline

- **Summary of activities since March BCT call**
- **LNAPL removal update**
- **Update on benzene and sulfate concentrations**
- **Pilot study extraction/injection update**
- **Path forward**



Site ST012 Activities Since Mar

- **SVE Rebound**
- **SVE Restart (1 Apr 2020)**
 - Extraction wells: SVE01S, SVE09S, SVE02M, SVE03M, SVE07D, and SVE14
 - Venting wells: SVE01M, SVE01D, SVE03D, SVE04M, SVE03S, SVE07S, SVE07M, SVE11, and SVE13
 - Closed wells: SVE02S, SVE02D, SVE04S, SVE04D, SVE05S, SVE05M, SVE05D, SVE06S, SVE06M, SVE06D, SVE08S, SVE08M, SVE08D, SVE09M, SVE09D, SVE10, and SVE12
- **LNAPL screening in select wells**
- **Pump Repairs**
 - UWBZ21 continued with limited pumping due to high temperatures
 - UWBZ22 pneumatic pump plugging
 - UWBZ30 continues to pump
 - CZ23 pumping now. Motor replaced, well redeveloped. Marginal improvements
- **Sodium sulfate injections.**
 - Injections complete on 31 Mar 2020



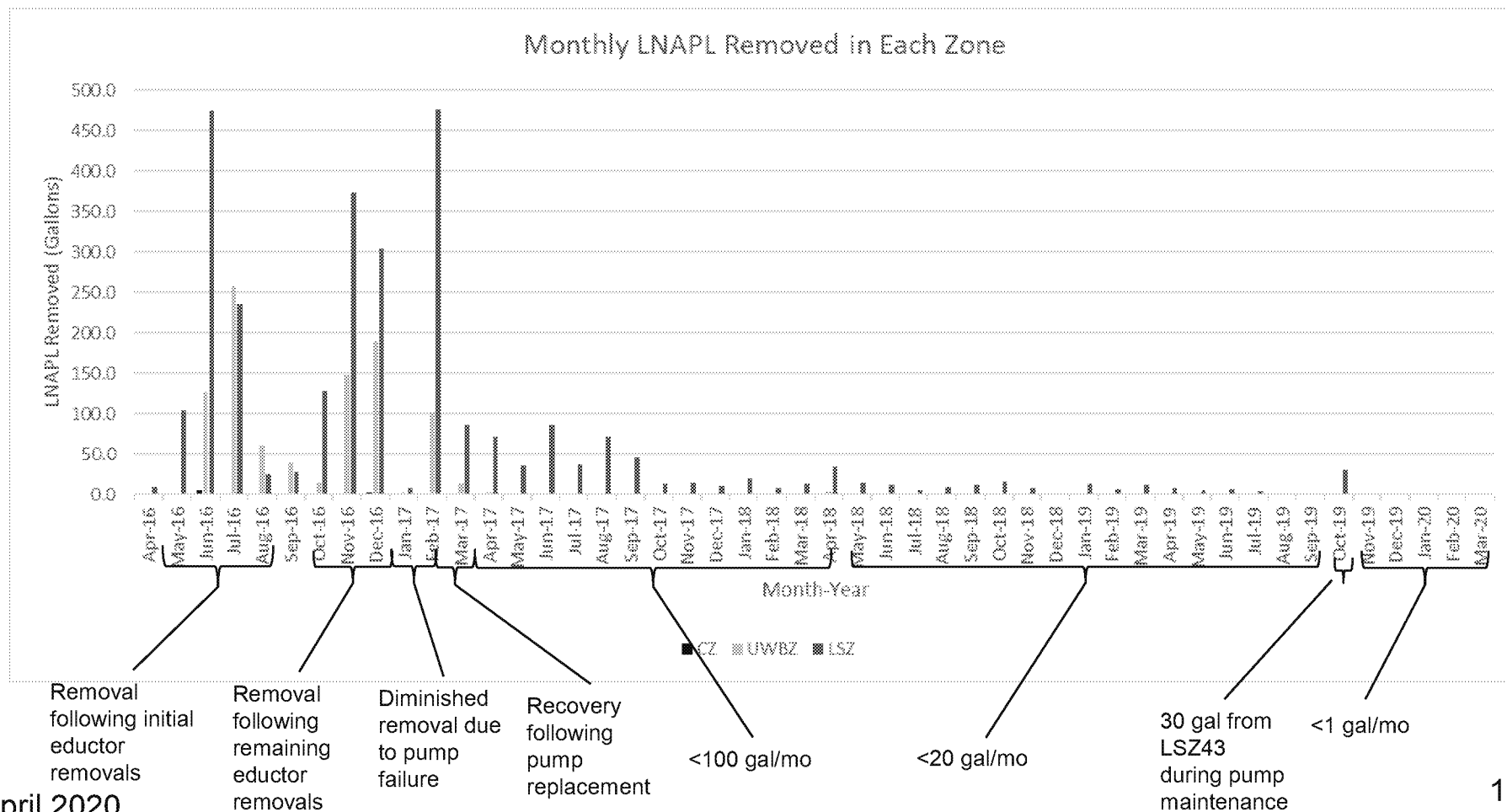


LNAPL Removal Update (through 6 Apr)



ST012 LNAPL Removal Summary

- CZ – 7.75 gallons of LNAPL removed. None since Feb 2020
- UWBZ – 963 gallons of LNAPL removed. None since Apr 2019
- LSZ – 2,874 gallons of LNAPL removed. 0.25 since Mar 2020 (LSZ36)





Preliminary First Quarter Groundwater Sampling Results

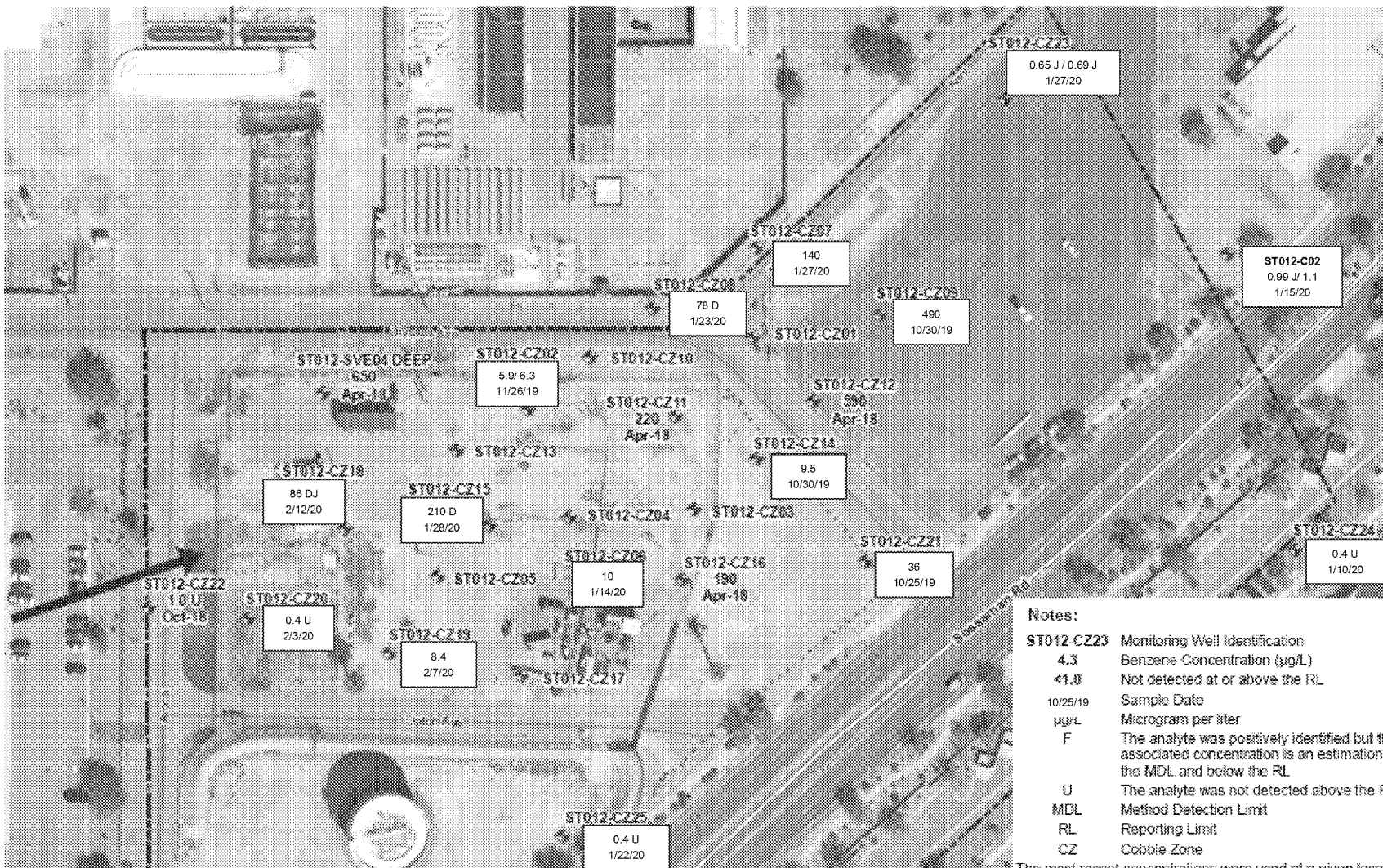


Sampling Summary

- **Sampling includes:**
 - Extraction Wells
 - Injection Wells (where injections took place)
 - Monitoring Wells (in areas where injections took place)
 - Perimeter Wells
- **General Observations**
 - Only a few new sulfate results in since last update



Site ST012 Benzene ($\mu\text{g/L}$) in CZ for Q1 2020



Notes:

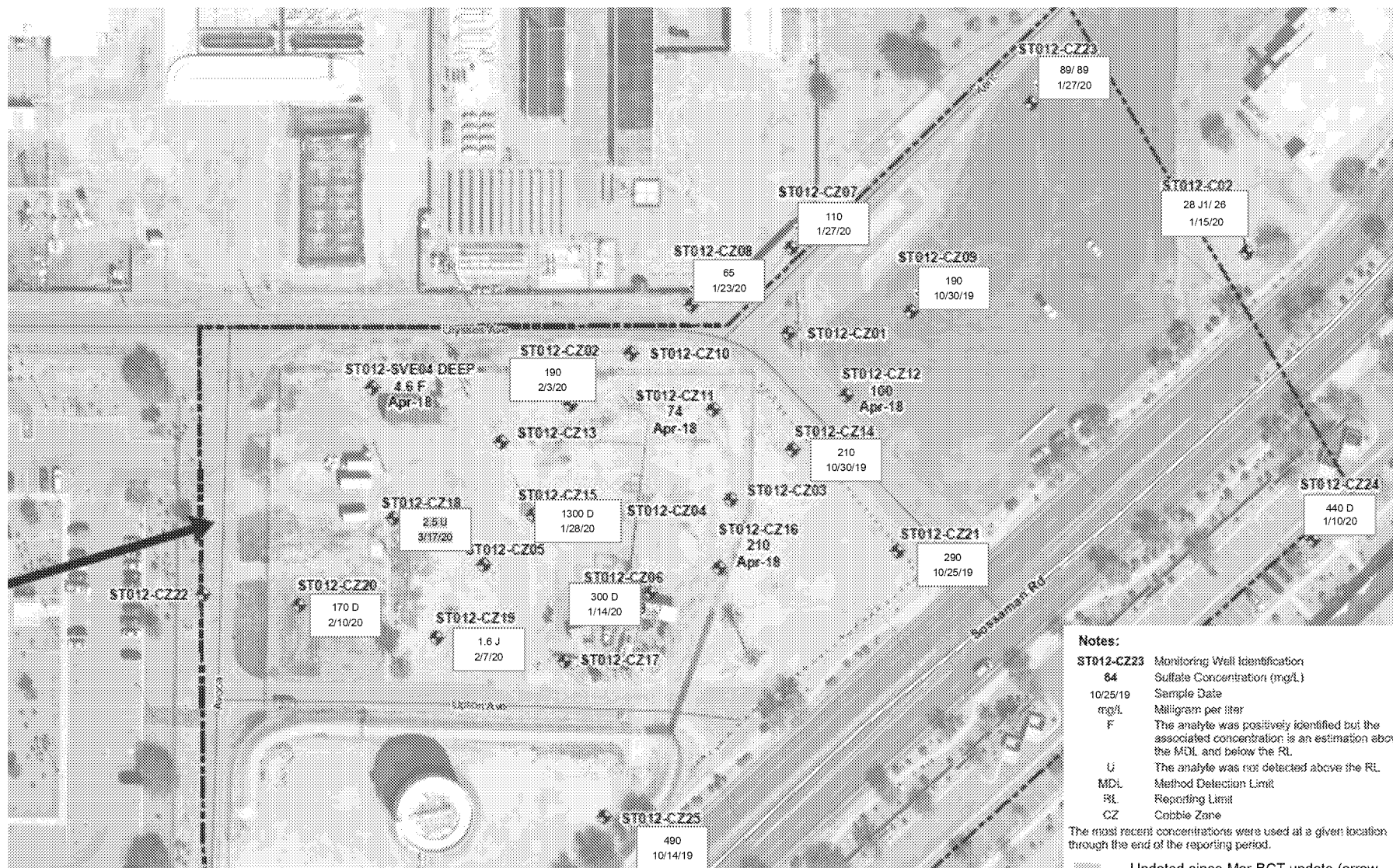
- ST012-CZ23 Monitoring Well Identification
- 4.3 Benzene Concentration ($\mu\text{g/L}$)
- <1.0 Not detected at or above the RL
- 10/25/19 Sample Date
- $\mu\text{g/L}$ Microgram per liter
- F The analyte was positively identified but the associated concentration is an estimation above the MDL and below the RL
- U The analyte was not detected above the RL
- MDL Method Detection Limit
- RL Reporting Limit
- CZ Cobble Zone

The most recent concentrations were used at a given location through the end of the reporting period.

- Updated since Mar BCT update (arrow indicates direction of change from previous result)
- D Sample was diluted



Site ST012 Sulfate (mg/L) in CZ for Q1 2020



Notes:

ST012-CZ23 Monitoring Well Identification
64 Sulfate Concentration (mg/L)
10/25/19 Sample Date
mg/L Milligram per liter
F The analyte was positively identified but the associated concentration is an estimation above the MDL and below the RL.
U The analyte was not detected above the RL.
MDL Method Detection Limit
RL Reporting Limit
CZ Cobble Zone

The most recent concentrations were used at a given location through the end of the reporting period.

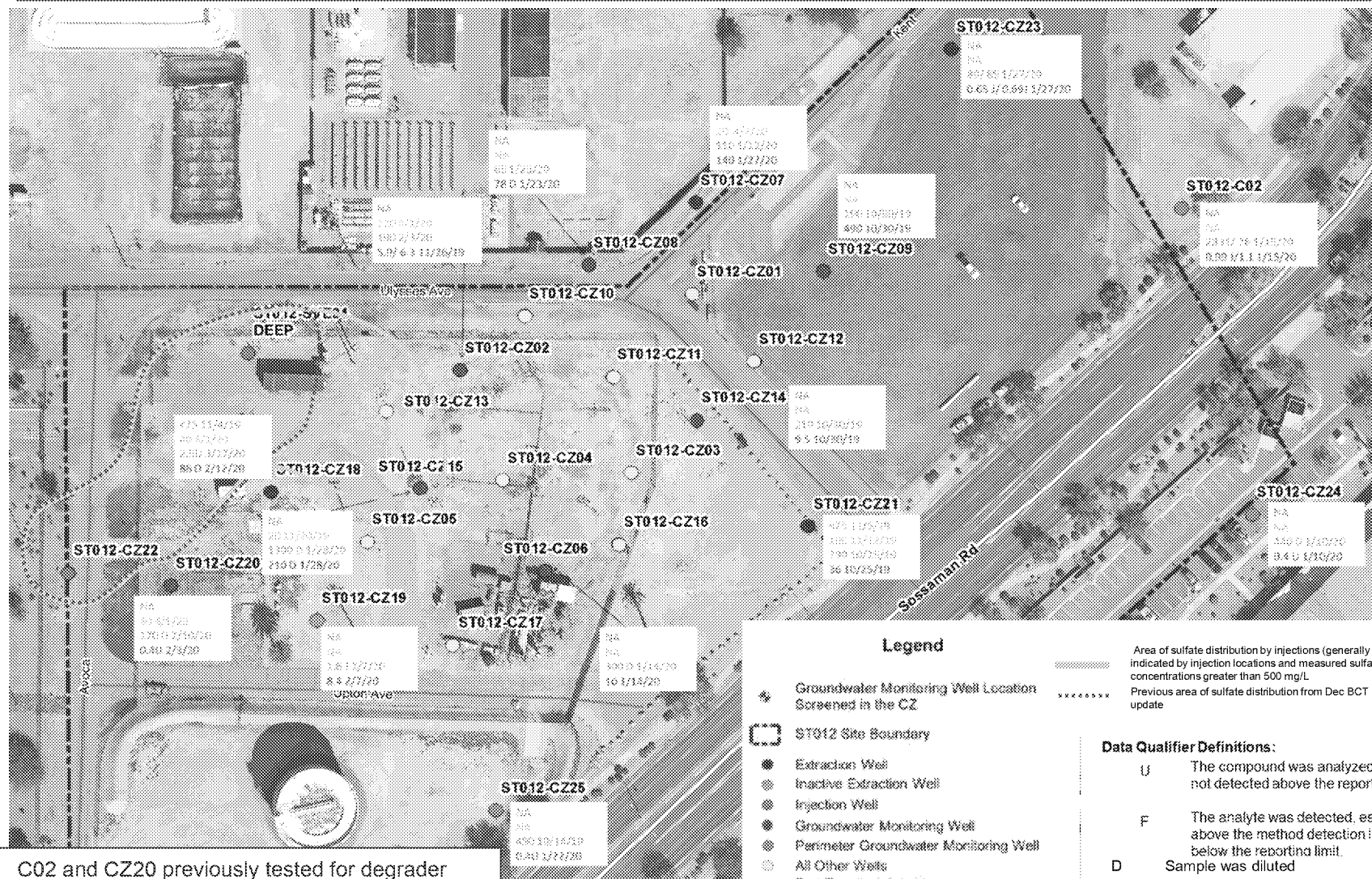
16 April 2020

D Sample was diluted

Updated since Mar BCT update (arrow indicates direction of change from previous result)



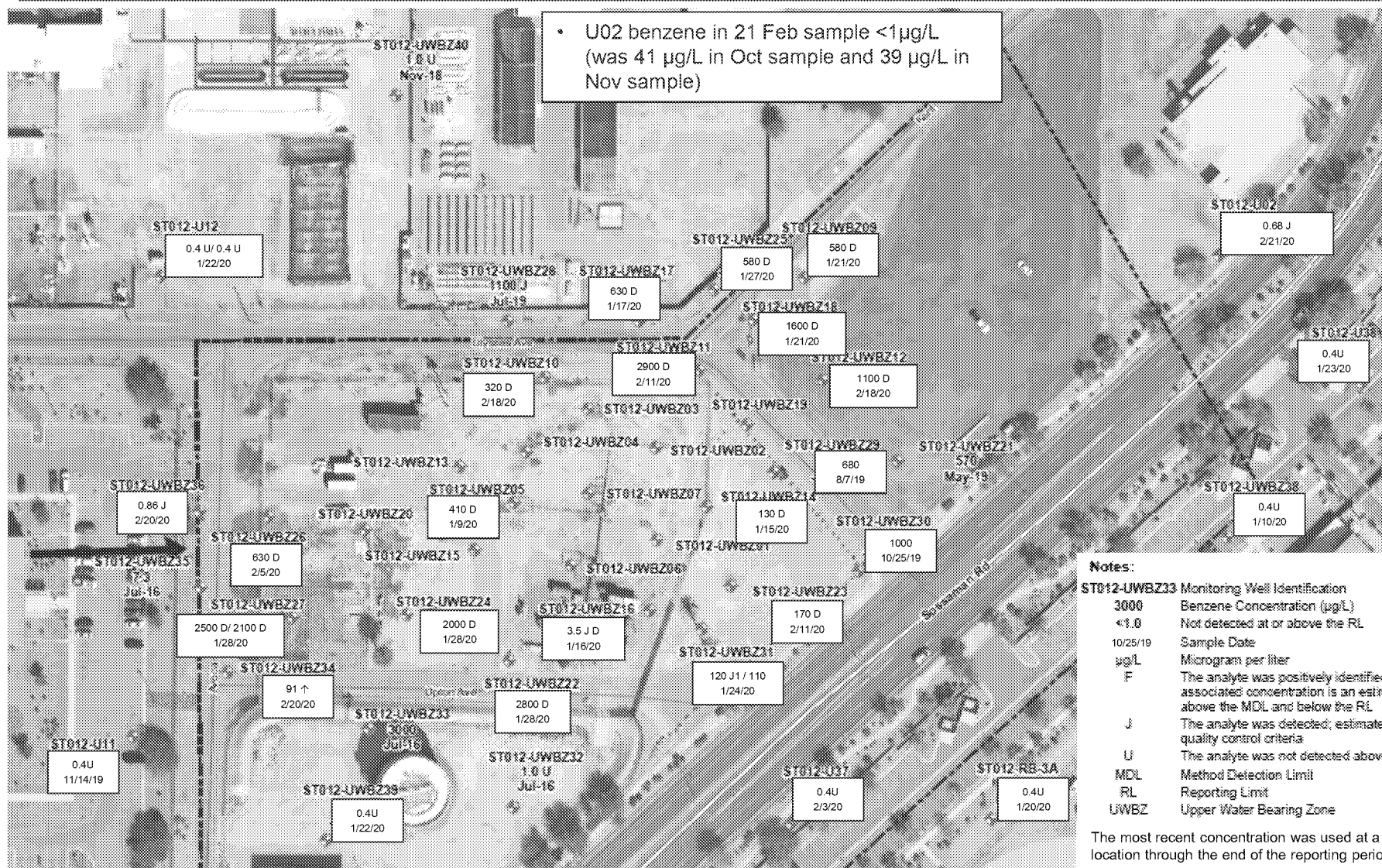
EBR Treatment Area in CZ for Q1 2020



16 April 2020



Site ST012 Benzene ($\mu\text{g/L}$) in UWBZ for Q1 2020



16 April 2020

D Sample was diluted

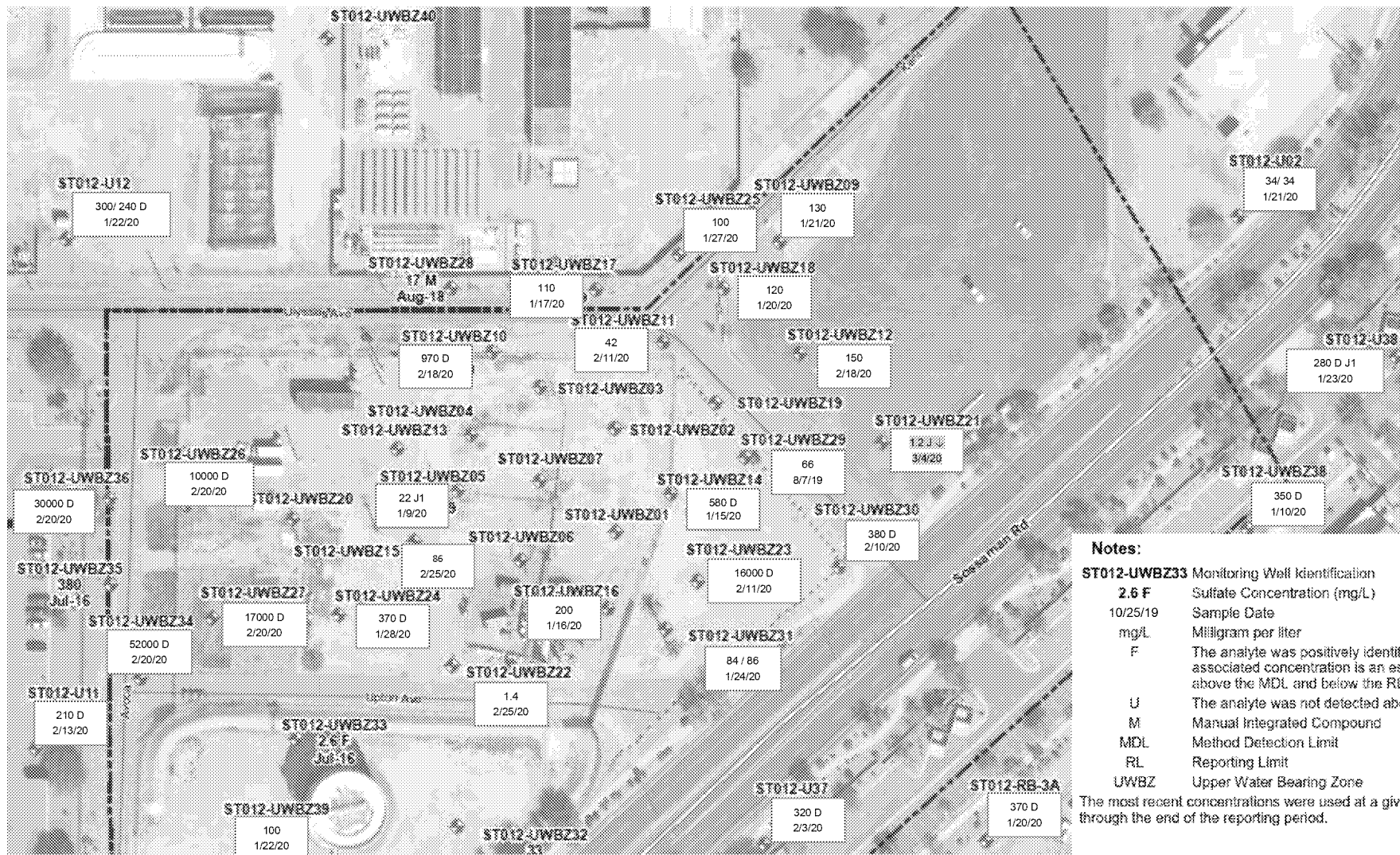
Updated since Mar BCT update (arrow indicates direction of change from previous result)

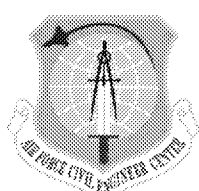
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ED_005025_00008815-00021

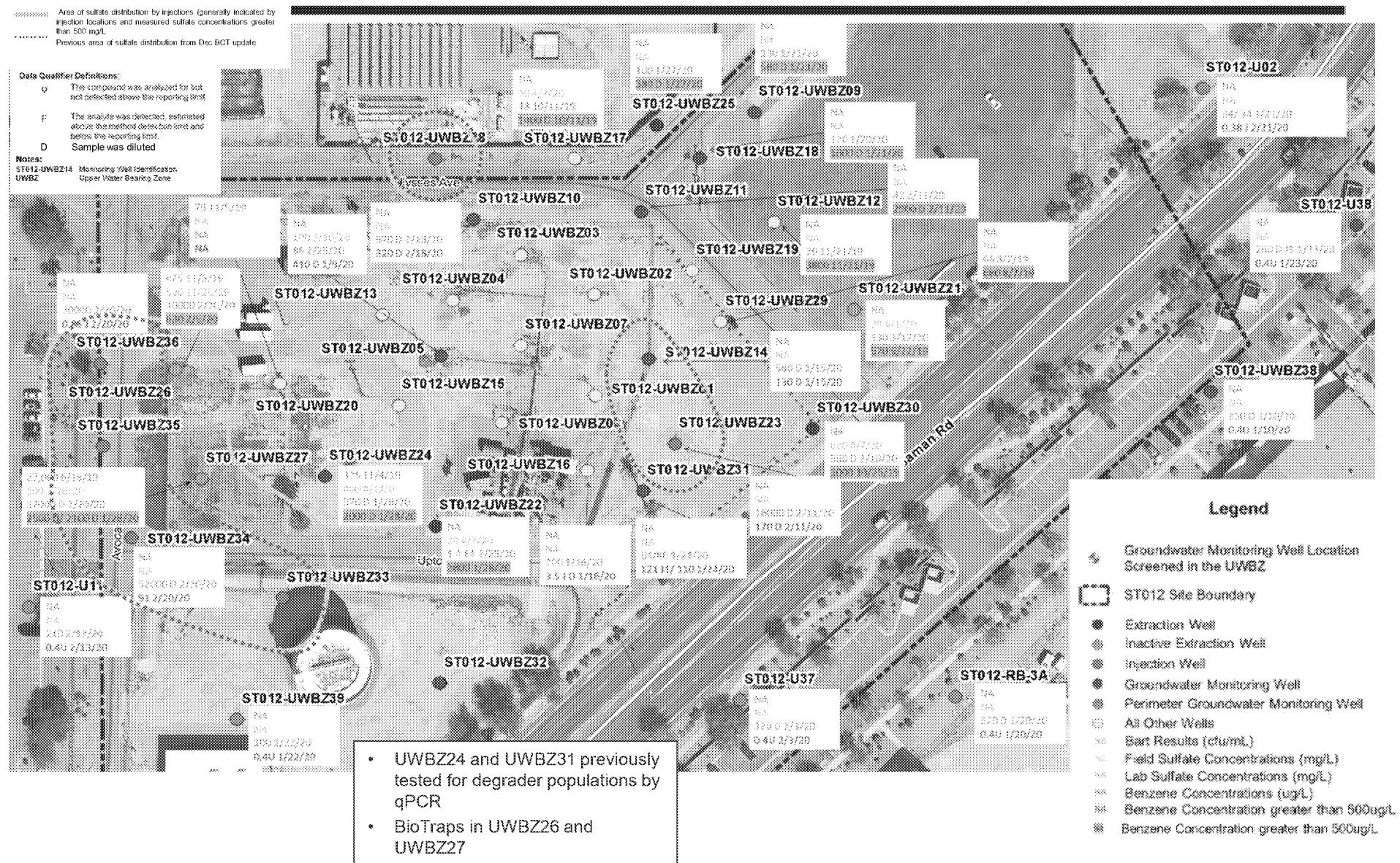


Site ST012 Sulfate (mg/L) in UWBZ for Q1 2020





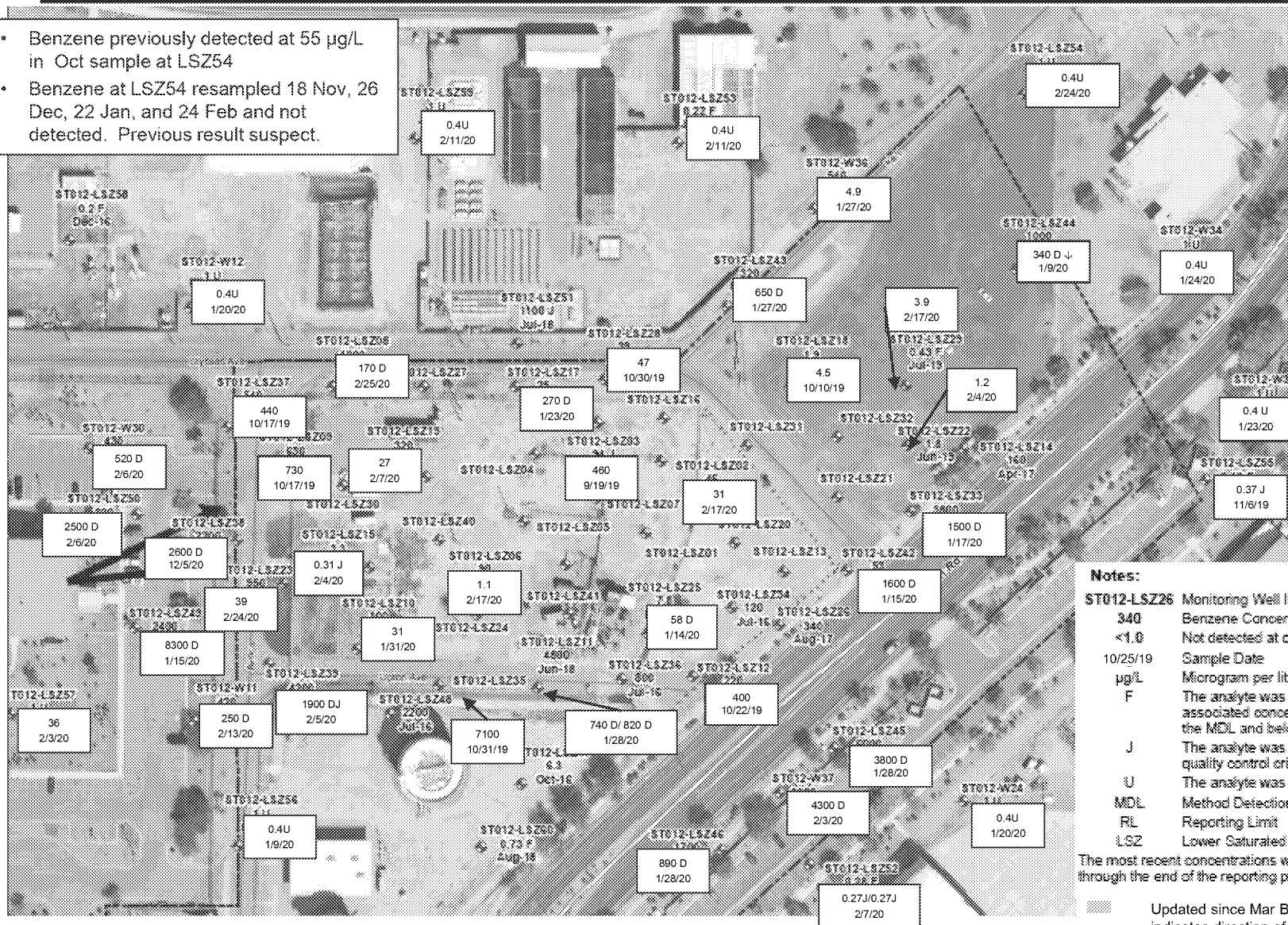
EBR Treatment Areas in UWBZ for Q1 2020





Site ST012 Benzene ($\mu\text{g/L}$) in LSZ for Q1 2020

- Benzene previously detected at 55 $\mu\text{g/L}$ in Oct sample at LSZ54
- Benzene at LSZ54 resampled 18 Nov, 26 Dec, 22 Jan, and 24 Feb and not detected. Previous result suspect.



Notes:

ST012-LSZ26 Monitoring Well Identification

340 Benzene Concentration ($\mu\text{g/L}$)

<1.0 Not detected at or above the RL

10/25/19 Sample Date

$\mu\text{g/L}$ Microgram per liter

F The analyte was positively identified but the associated concentration is an estimation above the MDL and below the RL

J The analyte was detected; estimated due to quality control criteria

U The analyte was not detected above the RL

MDL Method Detection Limit

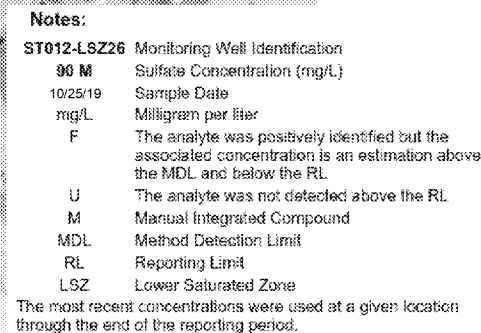
RL Reporting Limit

LSZ Lower Saturated Zone

The most recent concentrations were used at a given location through the end of the reporting period.

Updated since Mar BCT update (arrow indicates direction of change from previous result)

D Sample was diluted

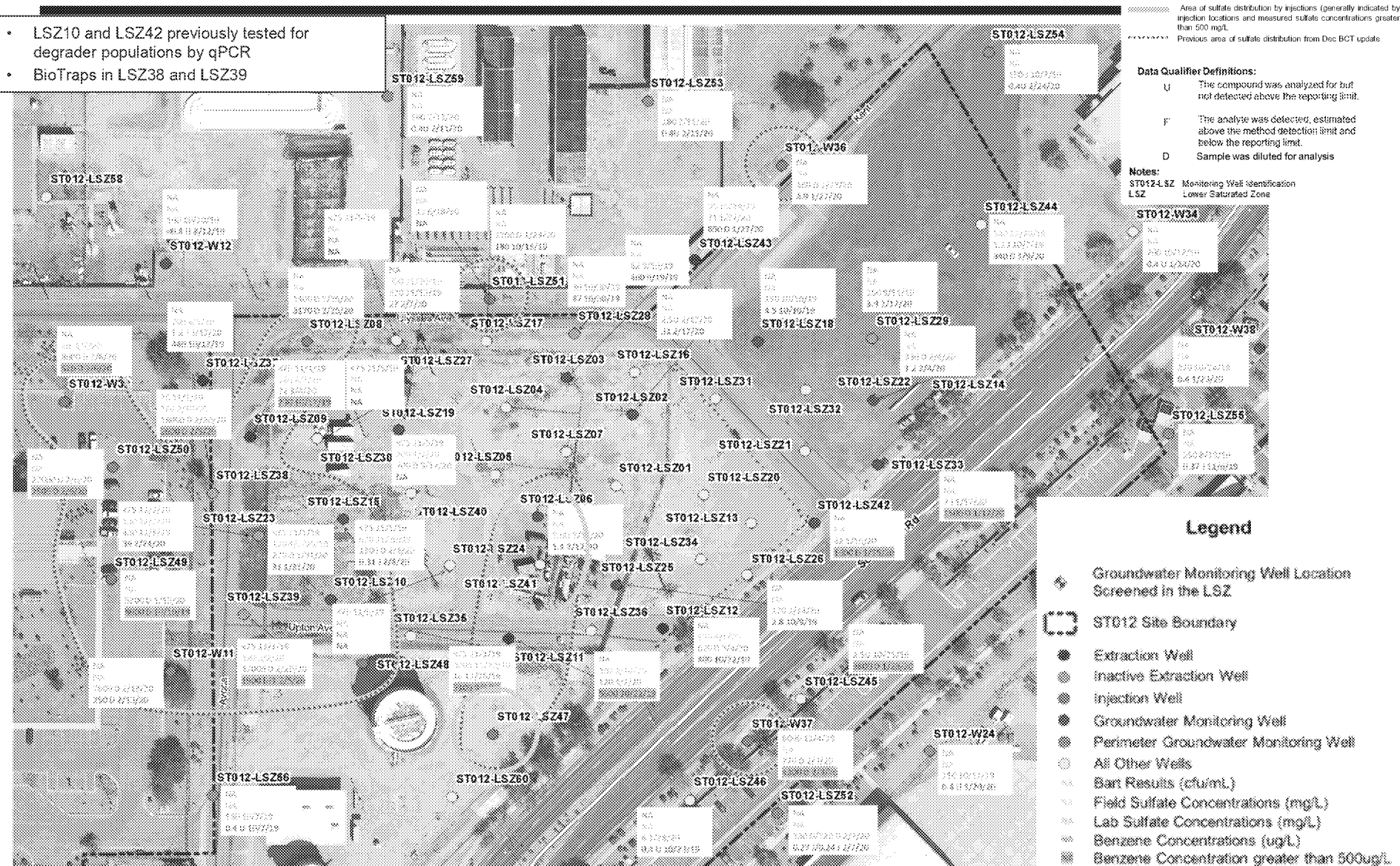


D Sample was diluted



EBR Treatment Areas in LSZ for Q1 2020

- LSZ10 and LSZ42 previously tested for degrader populations by qPCR
- BioTraps in LSZ38 and LSZ39



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Site ST012 Biological Testing

- **First set of BioTraps® pulled out from UWBZ26, UWBZ27, LSZ38, and LSZ39 on 30 Mar 2020**
 - Both sets came out, second set was immediately redeployed
 - Waiting for analytical results (SIP and QuantArray Petro)
- **Will retrieve second set of BioTraps® 20 Apr 2020**



Pilot Study Injection/Extraction Update



Site ST012 Extraction System Performance

Extraction Well	Calculated Average Extraction Rate in Period gpm	Maximum Temperature Since May 2018 °F	Most Recent Temperature °F	Cumulative Extraction Since May 2018 gallons	Note
ST012-CZ07	6.3	175	140	5,204,987	
ST012-CZ18	Off	136	126	3,019,867	Extraction stopped due to sulfate presence (Oct 2019)
ST012-CZ19	NA		103		Eliminated as an extraction well by FVM#7
ST012-CZ21	0.0	150	115	452,498	Totalizer reading suspect. Pump shut down due to low concentrations.
ST012-CZ23	3.0	114	102	744,783	Motor replaced
CZ Subtotal				9,422,136	
ST012-UWBZ21	18.3	170	149	638,328	Submersible installed but only runs for a few minutes/day (high temp)
ST012-UWBZ22	7.60	146	111	477,041	Pneumatic plugged, runs intermittently
ST012-UWBZ25	6.1	168	163	415,886	
ST012-UWBZ26	Off	133	114	2,408,709	Extraction stopped due to sulfate presence (Sep 2019)
ST012-UWBZ27	Off	128	94	130,011	Extraction stopped due to sulfate presence (May 2019)
ST012-UWBZ30	8.3	172	157	2,317,207	Submersible installed
UWBZ Subtotal*				7,655,615	
ST012-LSZ09	Off	140	130	2,748,461	Extraction stopped due to sulfate presence (Oct 2019)
ST012-LSZ11	0.0	141	97	4,210,215	
ST012-LSZ12	5.9	130	101	2,815,580	
ST012-LSZ23	Off	113	94	3,638,934	Extraction stopped due to sulfate presence (Aug 2019)
ST012-LSZ28	14.7	162	154	22,616	Intermittent pumping for warm makeup water.
ST012-LSZ29	NA	>170		17	Eliminated as an extraction well by FVM#7
ST012-LSZ37	NA	132	90	6,706,323	Extraction stopped to avoid pulling sulfate from BioTrap locations
ST012-LSZ38	Off	160	90	941,898	Extraction stopped due to sulfate presence (Aug 2019)
ST012-LSZ39	Off	92	78	1,250,933	Extraction stopped due to sulfate presence (May 2019)
ST012-LSZ43	4.0	148	139	1,189,741	
ST012-UWBZ28/LSZ51	NA	146	128	2,536,868	Extraction stopped (Aug 2019), changed to injection end of subphase 2
W36	NA	81	81	386,615	Only used for make up water for sulfate mixing
LSZ Subtotal*				24,793,153	
Total of Wells	74.3			42,257,518	
Treatment System	44.3			34,314,612	

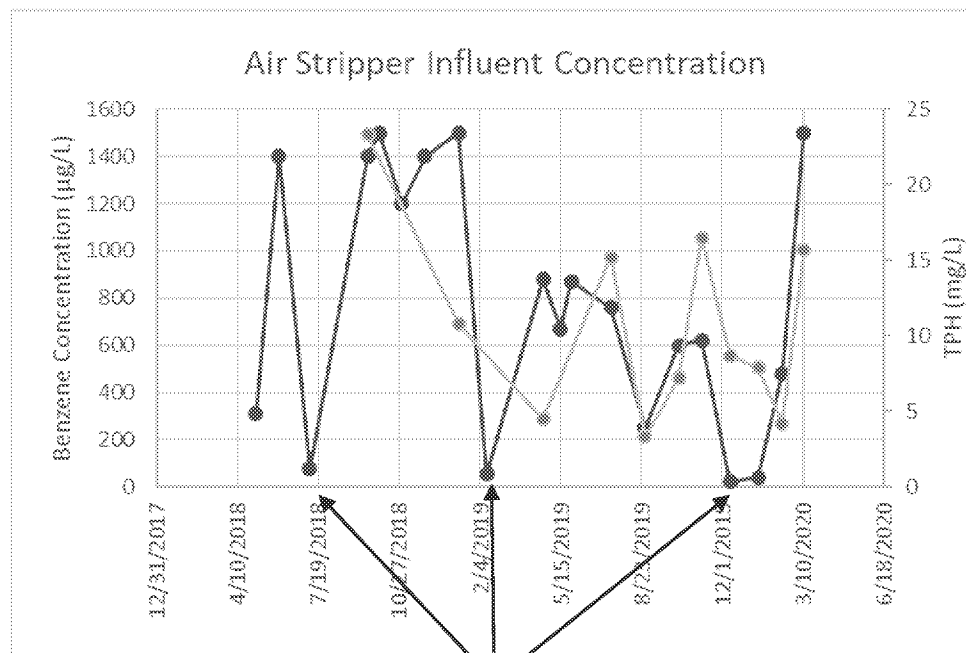
Data is preliminary

* Includes 1/2 of ST012-UWBZ28/LSZ51

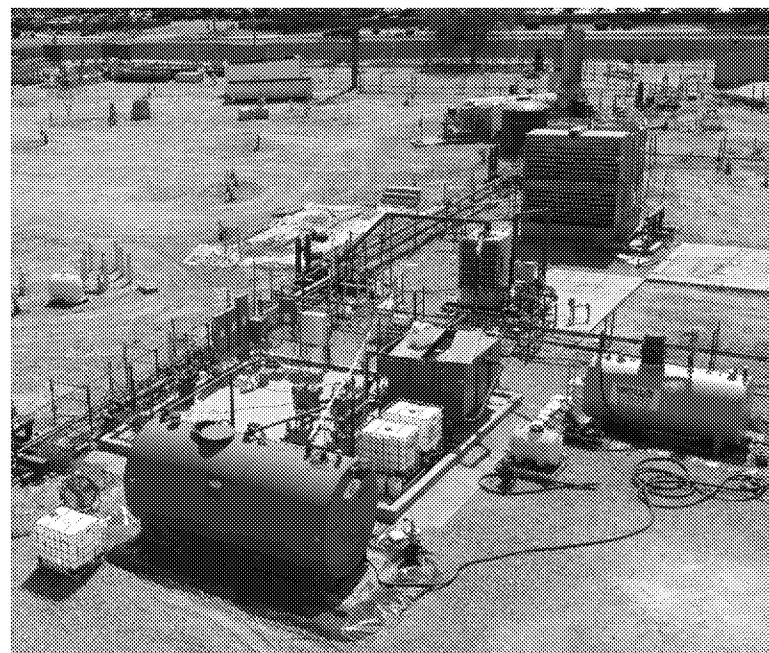


Site ST012 Extraction System Performance

- No LNAPL has been recovered since extraction started up
- Extraction pumps UWBZ21 and UWBZ22 pumping intermittently
- CZ18, CZ21, UWBZ26, UWBZ27, LSZ09, LSZ23, LSZ37, LSZ38, and LSZ39 turned off due to sulfate presence and SIP testing
- Benzene air stripper influent at 1,500 µg/L for March sample (April not yet available)



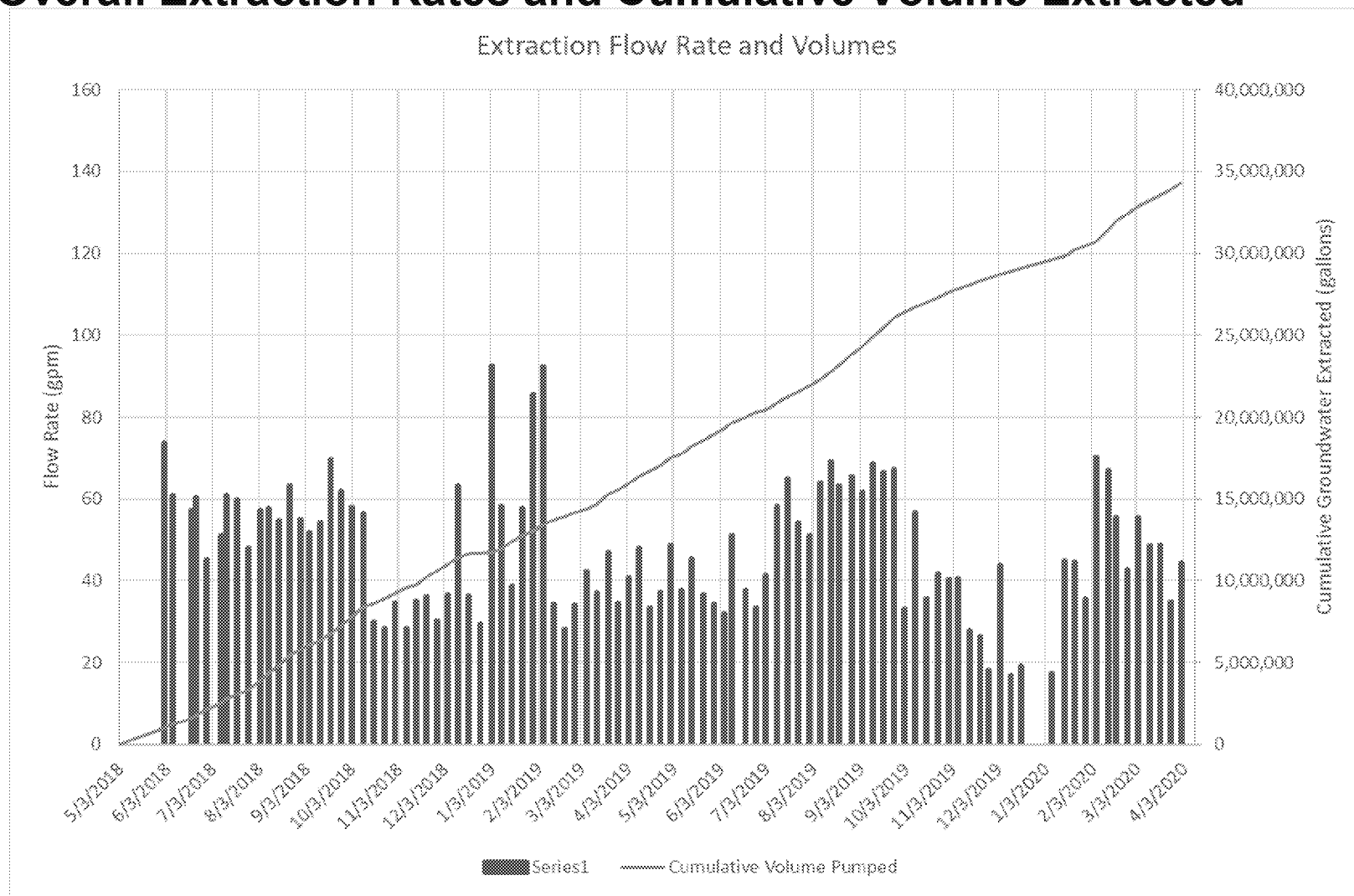
Low results considered outliers in mass removal calculations





Site ST012 Extraction System Performance

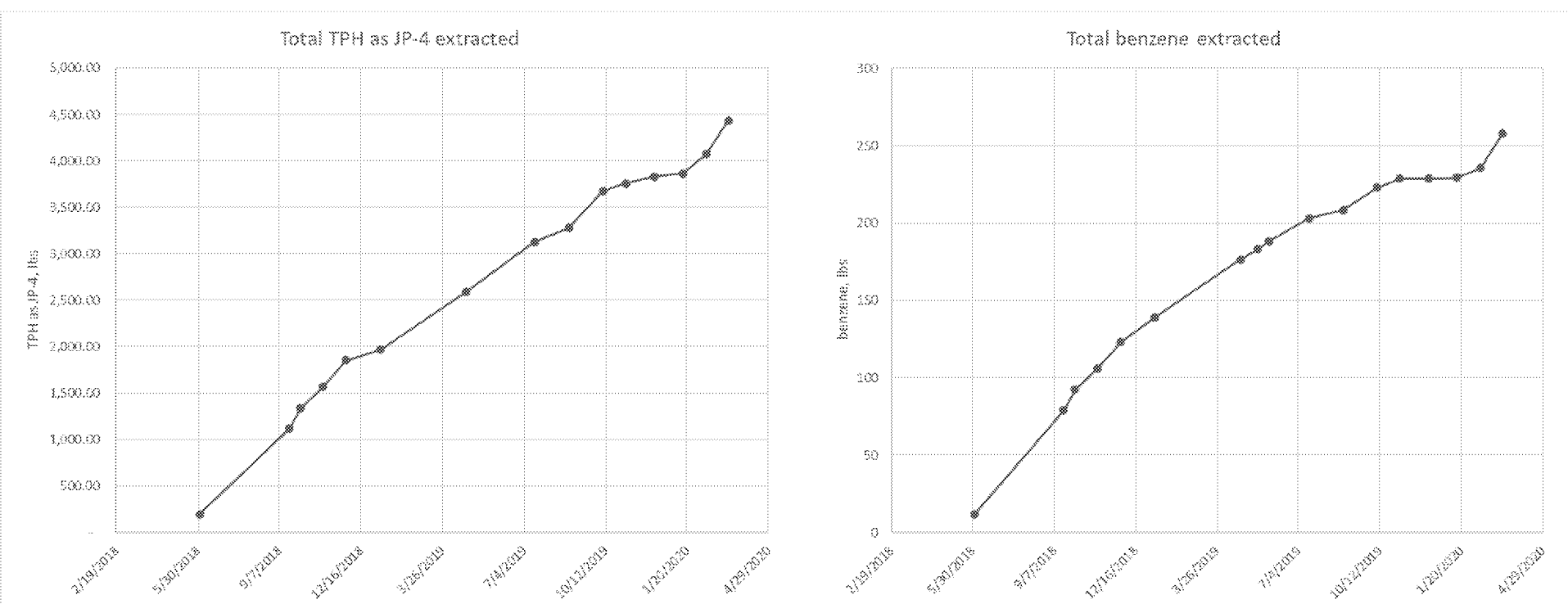
- Overall Extraction Rates and Cumulative Volume Extracted





Site ST012 Extraction System Performance

- Estimated Mass Removal by Extraction





Site ST012 Injection Progress

- Subphase 4 injections completed on 31 Mar 2020
- ~550 tons injected through 31 Mar 2020
- 7.3 tons injected since last update

Date	Volume (gallons)	Number of Bags of Sulfate Added	Calculated Na ₂ SO ₄ Conc. g/L	Calculated SO ₄ Conc. g/L	Locations(% of volume if multiple locations)
3/9/2020	2,000	1	113	76	W11 (1.2 tons)
3/26/2020	6,000	3	113	76	W30 (2.3 tons)
3/27/2020	2,000	1	113	76	W30 (1.6 tons)
3/30/2020	2,000	1	113	76	W30 (1 ton)
3/31/2020	2,000	1	113	76	W30 (1.2 tons)



Site ST012 Sulfate Field Screening

Date	Sulfate Concentration (mg/L)														
	CZ02	CZ03	CZ05	CZ10	CZ13	CZ16	CZ18	CZ07	CZ20	CZ21	UWBZ15	UWBZ17	UWBZ21	UWBZ22	UWBZ24
10/29/2019	90	80	80	100	100	110	80	70	80	100	120	---	90	80	0
11/5/2019	90	---	---	---	---	---	100	---	60	70	---	---	100	---	0
11/12/2019	---	---	---	---	---	---	---	80	---	100	110	---	---	130	---
11/20/2019	120	140	20	240	0	210	650	3000	380	off	100	---	20	0	700
11/26/2019	140	---	---	---	---	---	30	---	10	off	---	---	Off	---	450
12/3/2019	---	---	---	---	---	---	---	100	---	off	130	---	---	10	---
12/10/2019	120	---	---	---	---	---	140	---	110	off	---	---	40	---	100
12/17/2019	---	---	---	---	---	---	---	100	140	off	140	---	---	40	---
1/8/2020	130	---	---	---	---	---	145	---	140	off	---	140	50	---	100
1/14/2020	---	---	---	---	---	---	---	130	---	off	20	---	---	---	---
1/21/2020	340	---	---	---	---	---	20	---	80	off	---	180	100	---	80
1/27/2020	---	---	---	---	---	---	---	120	---	off	50	---	---	100	---
2/4/2020	400	---	---	---	---	---	90	---	120	off	---	210	140	---	80
2/11/2020	---	---	---	---	---	---	---	100	---	Off	70	---	---	60	---
2/18/2020	300	---	---	---	---	---	80	---	100	off	---	100	100	---	1350
2/25/2020	---	---	---	---	---	---	---	60	---	off	130	50	---	30	---
3/2/2020	300	---	---	---	---	---	70	---	80	off	---	60	80	---	1200
3/10/2020	---	---	---	---	---	---	---	50	---	off	100	50	---	50	---
3/17/2020	250	---	---	---	---	---	60	---	50	off	---	20	40	---	800
3/24/2020	---	---	---	---	---	---	---	60	---	off	80	30	---	40	---
4/1/2020	220	---	---	---	---	---	40	---	40	off	---	10	20	---	400
4/7/2020	---	---	---	---	---	---	---	10	---	off	140	50	---	20	---



Screening location is an extraction location



Screening location is a monitoring well



CZ18, CZ21, extraction shut down.

Suspect field screening results in October and November not included



Site ST012 Sulfate Field Screening

Date	Sulfate Concentration (mg/L)																			
	UWBZ26	UWBZ27	UWBZ28/LSZ51	UWBZ30	LSZ09	LSZ10	LSZ11	LSZ12	LSZ15	LSZ19	LSZ23	LSZ35	LSZ37	LSZ38	LSZ39	LSZ40	LSZ43	LSZ44	LSZ47	W30
10/29/2019	100	100	off	100	70	80	90	90	70	90	70	100	80	90	100	80	90	80	0	100
11/5/2019	110	---	off	70	90	90	---	70	---	---	90	---	230	60	80	60	---	---	---	---
11/12/2019	100	90	---	80	90	100	---	---	---	---	90	---	150	70	---	70	---	---	0	100
11/20/2019	600	480	OFF	off	790	470	120	2000	630	300	720	4000	400	2000	900	230	off	540	0	300
11/26/2019	500	---	off	off	650	350	---	600	---	---	off	---	530	460	---	90	---	---	---	100
12/3/2019	off	350	---	off	320	370	360	---	---	---	130	---	60	1060	---	200	---	---	0	-
12/10/2019	off	---	off	off	700	350	---	470	---	---	off	---	100	800	460	570	---	---	---	---
12/17/2019	off	300	---	off	310	370	200	---	---	---	off	---	120	750	---	550	---	---	0	130
1/8/2020	off	---	off	off	300	410	---	350	---	---	off	---	100	770	450	520	---	---	---	160
1/14/2020	off	40	---	off	80	330	370	---	---	---	off	---	20	450	---	124	---	---	0	---
1/21/2020	off	---	off	off	30	340	---	460	---	---	z	---	70	320	230	680	---	---	---	---
1/27/2020	off	40	---	260	4000	310	3530	---	---	---	off	---	---	210	---	660	---	---	500	200
2/4/2020	off	---	off	---	400	300	---	360	---	---	off	---	420	370	200	150	---	---	---	---
2/11/2020	injecting	50	---	400	30	40	420	0	---	---	off	---	---	300	---	680	---	---	0	180
2/18/2020	off	---	off	---	50	80	---	220	---	---	off	---	430	240	160	500	---	---	---	---
2/25/2020	BioTrap	100	---	440	40	240	440	---	---	---	off	---	---	Bio Trap	---	700	---	---	0	80
3/2/2020	off	---	off	---	40	250	---	200	---	---	off	---	400	Bio Trap	120	600	---	---	---	---
3/10/2020	BioTrap	biotrap	---	380	50	---	300	---	---	---	off	---	---	Bio Trap	---	490	---	---	0	70
3/17/2020	off	---	off	off	---	200	---	200	---	---	off	---	300	Bio Trap	Biotrap	430	---	---	---	---
3/24/2020	BioTrap	BioTrap	---	360	50	---	200	---	---	---	off	---	---	Bio Trap	---	450	---	---	0	70
4/1/2020	off	---	off	off	---	120	---	150	---	---	off	---	200	Bio Trap	Biotrap	350	---	---	---	---
4/7/2020	BioTrap	BioTrap	---	620	140	---	120	---	---	---	off	---	---	Bio Trap	---	200	---	---	0	20

 Screening location is an extraction location
 Screening location is a monitoring well

UWBZ26, UWBZ27, UWBZ28/LSZ51, LSZ09, LSZ23, LSZ37, LSZ38 and LSZ39 extraction shut down.
 Suspect field screening results in October and November not included
 Concentration in UWBZ30 increasing (consider shutting down extraction)



Site ST012 Path Forward Apr-May 2020

- **Continue SVE**
- **Continue pump repairs if necessary**
- **Pilot Study Implementation**
 - **Continue extraction and treatment**
 - **Receive 30 Mar 30 BioTraps® SIP and QuantArray Petro results ~ mid May 2020**
 - **Collect second set of BioTraps® for SIP and QuantArray Petro analysis on 20 Apr 2020**
 - **Preparation of Pilot Study Implementation Report**
 - **Continue with sulfate screening and quarterly sampling**

Air Force Civil Engineer Center



***2020 BCT
MEETINGS/CONFERENCE
CALLS SCHEDULE
DELIVERABLE TRACKING***

**BCT Conference Call
16 April 2020**

Air Force Civil Engineer Center



BCT GENERAL UPDATE AND ACTION ITEMS

**BCT Conference Call
16 April 2020**